UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,605	05/01/2001	Karl Jacob Haltiner JR.	DP-302846	7187

7590 03/12/2004

VINCENT A. CICHOSZ
DELPHI TECHNOLOGIES, INC.
Legal Staff Mail Code: 480-414-420
P.O. Box 5052
Troy, MI 48007-5052

EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

HL

Office Action Summary	Application No.	Applicant(s)
	09/847,605	HALTINER ET AL.
	Examiner	Art Unit
	Raymond Alejandro	1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 22 September 2003.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 and 23-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 and 23-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01 May 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10/30/03.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Response to Amendment

This office action is in response to the amendment filed on 09/22/03. The applicants have overcome the objections, and the 35 USC 112 rejection. However, the 35 USC 102 rejection and the 35 USC 103 rejections still stand for the reasons of record. Thus, the claims are finally rejected.

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-2, 5, 8-9, 23-24, 28-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Badwal et al 6280868.

The instant application is directed to an interconnect for fuel cell elements wherein the disclosed inventive concept comprises the particular flow passage configuration.

<u>With respect to claims 1 and 23:</u>

Badwal et al disclose an electrical interconnect device for a planar fuel cell having a solid oxide electrolyte, a cathode, and an anode (ABSTRACT); said interconnect containing substrate having fuel gas-flow channels one side and an oxidation-resistant coating on surfaces of the anode said adapted to contact the anode (ABSTRACT). The interconnects 20, 22 are identical with an array of gaseous fuel channels extending across the underside 26 and array of gaseous oxidant flow channels 28 extending across the top side 30 (col 5, lines 14-18). The interconnect device comprises a plate-like chromium containing substrate (col 3, lines 27-28); the interconnect should have a relatively high electrical conductivity (col 2, lines 15-17). *Thus, the*

substrate (single base) is conductive. It is further disclosed the technique of etching the surface of the interconnect prior to application of the metal layer (col 4, lines 35-40). *Since the interconnect surface is treated by etching, it is thus considered that the interconnect per se is an etched interconnect or an etched structured. Additionally, this provides a unique and distinctive surface geometry on both the anode and the cathode gas flow passages.*

With respect to the limitation of a unique geometry created by chemical machining, it is noted that Badwal et al disclose that the surface of the interconnect substrate may be treated by any one of several techniques including sputtering of the metals, electroplating of the metals, electroless plating of the metals, ion beam evaporation, physical vapour deposition, plasma spray and laser technique (COL 4, lines 25-34) as well as having the interconnect surface treated by etching, polishing/grinding, etc (COL 4, lines 35-38). Thus, Badwal et al is teaching to chemically machining the surface of both the anode and cathode flow passages. It is further noted that each of the above-described chemical treatment would impart a unique geometry to the flow passages. Furthermore, it is noted that such method limitation (i.e. by chemical machining) incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

It is further disclosed that by providing the gas flow channels on both sides, the interconnects 20, 22 may be used to form a fuel cell stack in which an identical fuel cell 12 overlies the interconnect 20 and another identical fuel cell 12 underlies the interconnect 22. Further identical interconnects may then be placed adjacent the opposite sides of the further fuel

cells, and so forth to build up a fuel cell stack of the desired number of fuel cells (col 5, lines 21-30/col 1, lines 35-38). *Thus, the anode and cathode gas flow passages have a geometry selected to provide fuel and oxidant gas flow according to system operation.* It is also disclosed that gas flow paths are provided between the interconnect and respective electrodes (col 1, lines 36-38). *Thus, the interconnect per se comprises gas flow channels which provides appropriate and satisfactory gas flow.*

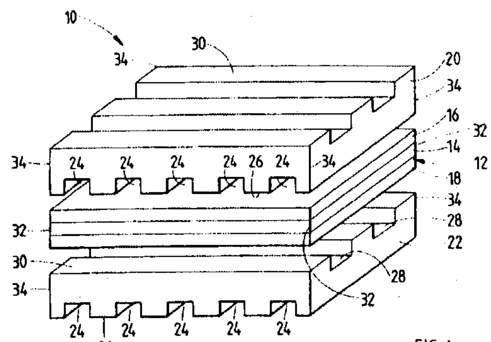


FIG 1

Figure 1 above illustrates a fuel cell assembly 10, the assembly comprises a fuel cell 12 comprising a solid oxide electrolyte central layer 14 with an anode layer 16 overlying one face of the electrolyte and a cathode layer 18 overlying the opposite face of the electrolyte. The fuel is sandwiched between a pair of interconnects 20, 22 which in use are in face contact with the anode 16 and cathode 18, respectively.

As for claim 2, 24:

Figure 1 above depicts interconnects 20, 22 comprising gas flow channels 24 and 28. As can be appreciated from Figure 1, the interconnect comprises a plurality of top side surfaces 30 and underside surfaces 26 closely spaced to each other which act as contact points between the interconnect and electrode and wherein said top side surfaces 30 and underside surfaces 26 have small dimensional diameters. *It is noted that the term "diameter" has been construed as the*

length of a straight line through the center of an object regardless of any specific geometric configuration.

As to claim 5, 24:

It is disclosed that gas flow paths are provided between the interconnect and respective electrodes (col 1, lines 36-38). *Thus, the interconnect per se comprises gas flow channels which provides appropriate and satisfactory gas flow.* It is disclosed that the purpose of the interconnect is to convey to convey heat away from fuel cells (col 5, lines 60-63/col 1, lines 11-16). The interconnect should have a relatively high thermal conductivity to provide improved uniformity of heat distribution (col 2, lines 19-21).

As to claim 8-9, 28-29:

It is further disclosed that the interconnect device has an oxidation-resistant coating on surfaces of the one side adapted to contact the anode (ABSTRACT/ Col 3, lines 25-35) wherein the coating comprises an outer oxygen barrier layer for electrically contacting the anode comprising Ni, a noble metal or an alloy thereof; and an electrically conductive metal barrier layer between the substrate and the outer layer (ABSTRACT/ Col 3, lines 25-35). *Thus, the electrically conductive metal barrier layer enhances electrical conductivity at the anode/interconnect interface; and the oxidation-resistant coating, in general, which is adapted to contact the anode conforms the surface of the interconnect to the fuel anode.*

Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 3-4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al 6280868 as applied to claims 1, 2 and 5 above, and further in view of Ruhl et al 6361892.

Badwal et al is applied, argued and incorporated herein for the reasons above. However, Badwal et al do not disclose: a) the specific contact point density, shape and diameter; and b) the specific flow passage depth and surface area.

With respect to claims 3-4:

Ruhl et al disclose one embodiment wherein at least one separator defines a micro-channel pattern (col 2, lines 57-59) and/or the separator surface has a plurality of columns extending therefrom, said columns defining variable cross-section micro-channels therebetween (col 3, lines 16-20). It is disclosed that the separator contacts the surface of one of the electrodes opposite the electrolyte (col 2, lines 56-57). *Thus, the separator acts as an interconnect.*

Figure 2A below shows a separator 6 defining microchannels 26 on either or both of its surfaces. Since the separators contact the anode and cathode surfaces, microchannels 26 defined within the separator surfaces provide reactant channeling (col 6, lines 33-40). A microchannel 26 may be defined by a quantity of regularly spaced circular columns 34 (*contact points*) extending between surfaces (col 6, lines 45-48). It is disclosed that it should be understood that a preferred pattern of columns 34 would utilize many more columns than shown, with each column having a diameter on the order of about 1 mm or less (col 6, lines 58-61/col 7, lines 48-52). The cell and

stack diameters are typically about 50 to about 80 mm (col 5, lines 10-12). *<u>The specific contact point density is apparent upon inspection of the separator plate 6 as illustrated in Figure 2A.</u>*

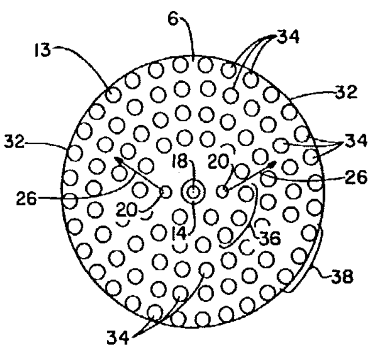


FIG.-2A

<u>With respect to claims 6-7:</u>

It is disclosed that the depth of the microchannels 26 may comprise substantially the entire thickness of the electrode 13 (col 6, lines 63-65). It is further disclosed that the depth of the micro-channel is generally on the order of about 0.1 to about 0.5 mm, although the micro-channel can be as deep as the thickness of the electrode layer. It is also disclosed that the crossflow channels in the separator has a depth "c" on the order of <u>1 mm</u> (col 8, lines 53-67).

It is further disclosed that the height (h) of each column 34 is generally on the order of about 0.05 mm to about 0.4 mm (col 6, lines 61-63). The width of the micro-channel is generally on the order of about 0.1 to about 0.5 mm (col 8, lines 55-56). Thus, ***<u>the specific surface area ratio between the flow passages surface area and the projected area</u>*** is apparent based on the disclosed magnitudes of column diameter and height; and width and height of the channel. Accordingly, *<u>the surface area of a cylinder</u>* (column or projected area) can be determined as follows: $\mathbf{A}_{\text{surface cylinder}} = \mathbf{2\pi r^2 + 2\pi rh}$ (where r is the radio of the circular column and h is the

column height); and the surface area of the flow channel can also be determined as follows: **A** $_{\text{surface rectangle}}$ = **height x width**.

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the contact points on the interconnect of Badwal et al by having the specific contact point density, shape and diameter of Ruhl et al because Ruhl et al teach that flow channel dimension, shape and contact percentage can be customized and controlled through the channel design for enhancing reactant distribution of the cell. Accordingly, those of ordinary skill in the art would find motivation to make the specified contact point density in the interconnect of Badwal as it is evident from Ruhl et al's teaching that a preferred pattern of columns would utilize many more columns than shown in the simplified figure (see col 6, lines 58-60). Thus, the preferred pattern may be designed to control flow distribution within a cell by defining pathways that offer reduced resistance in comparison with the surrounding material wherein the flow distribution may be further controlled by the number, size or arrangement of the micro-channels within the cell. The preferred pattern is designed with consideration to the column spacing and the contact area percentage. Further, those of ordinary skill in the art would find motivation to make the specific contact point shape in the interconnect of Badwal et al as Ruhl et al teaches that columns (contact point) of different geometries may be utilized to provide customized flow characteristics so that reactant gas flowing though the shaped channel achieves tailored local flow, pressure and velocity distributions. Moreover, those of ordinary skill in the art would have motivation to make the specified contact point diameter in the interconnect of Badwal et al as Ruhl et al disclose that the preferred pattern utilizes column having the specific diameter which help to minimize the cell pressure drop, to achieve a good gas velocity, thereby

preventing the surrounding gas mixture from diffusion backward into the cell. Accordingly, the diameter of the columns and their contact area percentage would be selected as a compromise between minimizing electrical resistance, achieving good reactant gas distribution to and from the active electrode sites, achieving the target pressure drop with a minimum pattern thickness and fabrication limitations.

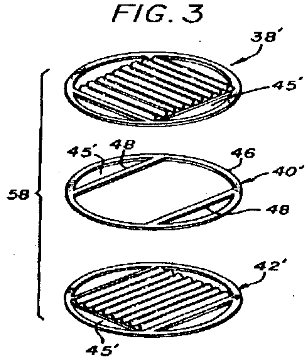
With respect to the specific flow passage depth and the surface area, it would have been obvious to one skilled in the art at the time the invention was made to make the interconnect of Badwal et al <u>by having specified flow passage depth and surface area</u> of Ruhl et al because Ruhl et al teaches that the specific depth of flow passage (channel) and surface area relationship should defines a channel pattern wherein the channel cross-section is enhanced such that reactant gas flowing through the passages (channel) achieves tailored local flow, pressure, and velocity distributions. Accordingly, those of ordinary skill in art would find motivation to make the specified flow passage depth and surface area relationship in the interconnect of Badwal et al as Ruhl et al teaches that such flow passage depth and surface area relationship (overall dimension), in general, achieve a specific target overall pressure drop that minimize electrical resistance and improves reactant gas distribution.

5. Claim 10 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al 6280868 as applied to claims 1 and 23 above, and further in view of Minh et al 5256499.

Badwal et al is applied, argued and incorporated herein for the reasons above. In addition, Badwal et al do not expressly disclose the specific manifolds comprising through passages arranged along outer perimeter of the interconnect.

Minh et al disclose manifolds of a solid oxide fuel cell which are integrally formed with the fuel cell's core; the fuel cell includes an interconnect wherein the interconnect is provided with cutouts that define manifold passageways for the fuel and oxidant (ABSTRACT). ***Figures 2D and 3*** show interconnects 38 and 38' having through passages along outer perimeters thereof and one cell unit wherein through passages are aligned and matched to form an assembled fuel cell unit.

FIG. 3



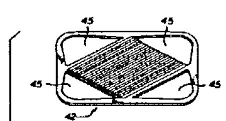


FIG. 2B

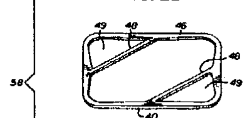


FIG. 2C

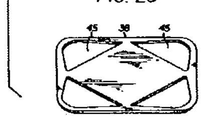


FIG. 2D

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the specific manifolds comprising through passages arranged along outer perimeter of the interconnect of Badwal et al as taught by Minh et al as Minh et al teach that an interconnect design with integral gas manifolds is desirable because fuel

cell core design with integral gas manifold minimize stringent tolerance requirements for stack hardware design. Accordingly, mechanical stability and structural integrity is improved by using the specific integral manifolding assembly of fuel cells having multiple, stacked individual cells. *It is further noted that Badwal et al's teaching also encompass fuel cell arrangements having either external or internal (integral) manifolding configuration.*

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al 6280868 as applied to claim 23 above, and further in view of Hsu 6024859.

Badwal et al is applied, argued and incorporated herein for the reasons above.

Badwal et al also teach that an external manifolding arrangement as possible options for the gaseous fuel and oxidant (col 1, lines 47-49).

However, Badwal et al do not disclose the specific external stamped sheet metal manifolds.

Hsu discloses an electrochemical converter which is preferably a fuel cell such as a solid oxide fuel cell (col 6, lines 60-65); wherein the textured pattern of the top and bottom of the interconnector plate can be obtained by stamping metallic alloy sheets (col 10, lines 11-15) wherein the gas passages networks are formed and the manifolds is formed in the interconnector plate (col 10, lines 20-25).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specified external stamped sheet metal manifolds in the external manifolding of Badwal et al because Hsu teaches that stamped metallic alloy sheets can be used for manifolding purposes because the stamping method is capable of producing articles of varied

and complex geometry while maintaining uniform material thickness. Thus, a suitable external stamped metal manifold having uniform material thickness and satisfactory geometry is obtained.

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al 6280868 as applied to claim 23 above, and further in view of Fraioli 4510212.

Badwal et al is applied, argued and incorporated herein for the reasons above. However, Badwal et al do not disclose the interconnect being fused to the fuel cell.

Fraioli discloses solid oxide fuel cells (title) wherein all active core materials including the anode, the cathode, the electrolyte (the fuel cell components) and the interconnect are integrally fused together (Col 10, lines 21-25/Claims 2-3 and 12).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to fuse the interconnect to the fuel cell of Badwal et al as taught by Fraioli as Fraioli teaches that fuel cell components including the anode, the cathode, the electrolyte and the interconnect are fused together to make a fuel cell core construction integrally joined or connected together. Thus, mechanical stability and structural integrity of the fuel cell structure is enhanced. Further, this fused structure would minimize the effects of differential thermal expansion across the surfaces of each fuel cell component constituting the entire fuel cell structure.

Response to Arguments

Applicant's arguments filed 09/22/03 have been fully considered but they are not persuasive. The main contention of applicants' arguments in premised on the assertion that the prior art of record does not teach or suggest "the anode gas flow passages and cathode gas flow passages having a unique geometry prepared by chemical machining and selected to optimize fuel and oxidant gas flow". However, this assertion is respectfully disagreed with. In that, it is noted that the prior art discloses several techniques for chemically treating or processing the surface of the interconnect. To be precise, Badwal et al specifically disclose that the surface of the interconnect substrate may be treated by any one of several techniques including sputtering of the metals, electroplating of the metals, electroless plating of the metals, ion beam evaporation, physical vapour deposition, plasma spray and laser technique (See COL 4, lines 25-34) as well as having the interconnect surface treated by etching, polishing/grinding, etc (See COL 4, lines 35-38). *In this manner, the prior art clearly teaches to chemically machining the surface of both opposite surfaces of the interconnect which form the anode and cathode flow passages thereon. In addition, it is noted that each of the above-described chemical treatments would impart a unique and distinctive geometry to the flow passage surface. That is, the surface of the flow passages will exhibit unique shapes or geometries due to the nature of the surface treatment technique. Moreover, although the prior art positively disclose the employment of chemical techniques to treat the foregoing interconnect surface, it is remarked that such method limitations (i.e. by chemical machining) incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and*

not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

With respect to the assertion that such "unique geometry is selected to optimize fuel and oxidant gas flow", it is contended that the flow passages in the prior art, like any other conventional passages, is formed or made to allow fluids to flow therethrough. Having said that, it is stated that those of ordinary skilled in the art would clearly recognize that such flow passages provide acceptable flowing characteristics because they are ultimately designed to permit smooth or turbulent uninterrupted movement or circulation of masses of material or streams, and therefore, the flow passages per se are patterned to suitably enhance and tolerate the motion characteristics of fluids. Further, applicants admit the prior art's flow channels having the same geometry for both and oxidant channels are "*operational*", but "*operational is not the same as optimal*" (See page 8, lines 1-2 of the amendment). In this respect, it is further contended that having "*something operational*" strictly translates to make it, operate it or produce it in the <u>most favorable or best possible mode or manner</u> as the general rule of thumb in research and development is to actually investigate and explore for advancing and improving objects. Hence, it is stated that the flow channels of the prior art, at the time they were made or invented, did provide optimal operational flow characteristics. It is also contended that the term "optimal" is a relative term, which has not been defined by the applicant in term of any specific "*flowing rate capacity*". That is to say, the instant claims are silent to specific flow rate characteristics reciting a precise degree of gas flow that further distinguish from the gas flow of the prior art. Therefore, the disclosed flow passages are sufficiently <u>deep</u> and <u>conformed in shape and surface area</u> so as

to provide the necessary functionality and structural relationship <u>to satisfy the requirements of reactant mixing and heat transfer</u>.

As to the etched interconnect, since the interconnect surface of the prior art is treated by etching, the examiner thus considers the interconnect derived/produced from such etching process is an etched interconnect, and therefore, the prior art meets the requisite degree of teaching <u>an etched structure</u> as instantly claimed. It is noted the etching process itself imparts to the interconnect the required structural characteristic of being an etched interconnect.

As far as the anode gas flow passage geometry comprising a large quantity contact points, it is pointed out that applicants' contact points do not positively recite a particular structure or configuration to physically differentiate them. Accordingly, the absence of structurally-defined contact points in applicants' invention prompted the examiner to establish that the large wide ribs of the prior art stand for contact points as well, and therefore, these wide ribs are substantially equivalent in functionality to the claimed contact points.

The assertion that the prior art failed to teach the yielding layer is respectfully but strenuously disagreed with. For example, the '868 patent clearly teaches the use of an oxidation resistant coating on surfaces of the anode (*as admitted by the applicants, see page 9, second full paragraph of the amendment*). In this regard, the examiner maintains his position that the metal barrier layer itself serves as the claimed yielding layer enhancing conformity of the interconnect to mating fuel cell surfaces because this barrier layer is in direct physical contact with fuel cell components, and therefore, it necessarily conforms thereto so as to provide suitable fitting or mating contact between the interconnect and the fuel cell components. In general, interconnects are manufactured, among other requirements, to suitably conform fuel cell components as well

as to maintain chemical stability and mechanical integrity at the interconnecting boundaries. Moreover, the absence of a materially-defined yielding layer in applicants' invention further the foregoing examiner's position.

Applicants' contention that Ruhl's micro-channel has a small size, on the order of about 0.5 mm or less is courteously disputed because, in fact, Ruhl directly teaches the use of micro-channels within the claimed range given that his teachings encompass micro-channels on the order of, at least, about 0.5 mm. Thus, in this case, since the claimed range overlaps or lies inside the range disclosed by the prior art, a prima facie case of obviousness clearly exists as it has been held that the term "about" allows for magnitudes slightly above, for instance, 0.5 mm, hence, the range overlaps (***See MPEP 2144.05 Obviousness of Ranges: I. Overlap of Ranges***). As a result, Ruhl's geometrical dimensions are on the same scale as the instant claims and such geometrical dimensions provide suitable flow depth and heat transfer area.

In response to applicant's argument that "Minh's integrally formed manifolds and his preparation process limit the flow field geometries", the fact that applicant has recognized another advantage/disadvantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). *Additionally, it is stated that Minh's manifold formation process, to some extent, imparts a unique and distinctive shape or geometry to the formed manifold.*

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., *i- the unique geometry by varying the cross-section and width of the channels, ii- the convective heat transfer,*

iii- hardened fuel cells in contrast to fusing green ceramic tapes) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

RAM